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SUMMARY OF UNCLASSIFIED CALCULATIONS ON [illegible] OF COBALT-60 IN FUSION DEVICES

1. Assuming the production of one neutron per 10 mev of energy release*, a 1-megaton bomb would produce 2.5×10^{27} neutrons.

2. If every neutron were to be captured by a Co^{59} nucleus, it would require 2.5×10^{5} grams (about 550 lbs.) of Co^{59} or a volume of one cubic foot.

3. In view of the low cross section of Co^{59} and the attenuation of Co^{59} as a result of the explosion, it is assumed that less than 0.1% of the neutrons released would be absorbed in Co^{59}.

4. If one arbitrarily selects 0.1% as the percentage of neutrons produced that will react with a Co^{59} nucleus, a 1-megaton fusion device would produce 2.7×10^{5} curies of Co^{60}. Assuming that 25% of this activity fell out in 5,000 square miles around ground zero, the initial dose rate from Co^{60} would be about 0.15 mr/hr. This would be insignificant compared to the radiation dose rate from the fission products from a nuclear weapon for many months after detonation.

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* Some possible reactions are:

$${}_1H^2 + {}_1H^2 \rightarrow {}_2He^3 + {}_0n^1 + 4.0 \text{ Mev}$$
$${}_1H^3 + {}_1H^2 \rightarrow {}_2He^4 + {}_0n^1 + 17.6 \text{ Mev}$$
$${}_1H^3 + {}_1H^3 \rightarrow {}_2He^4 + 2\,{}_0n^1 + \underline{11.4 \text{ Mev}}$$

AVERAGE 9.76 Mev

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